Centers for Disease Control and Prevention
MMWR Morbidity and Mortality Weekly Report
Early Release / Vol. 59 October 5, 2010

Vital Signs: Binge Drinking Among High School Students and Adults — United States, 2009

ABSTRACT

Background: Binge drinking was responsible for more than half of the estimated 79,000 deaths and two thirds of the estimated 2.3 million years of potential life lost as a result of excessive drinking each year in the United States during 2001–2005.

Methods: CDC analyzed data from the 2009 Behavioral Risk Factor Surveillance System (BRFSS) on the prevalence of binge drinking (defined as consuming four or more alcoholic drinks per occasion for women and five or more for men during the past 30 days) among U.S. adults aged ≥18 years who responded to the BRFSS survey by landline or cellular telephone. Data also were analyzed from the 2009 National Youth Risk Behavior Survey (YRBS) on the prevalence of current alcohol use (consuming at least one alcoholic drink during the 30 days before the survey), and binge drinking (consuming five or more alcoholic drinks within a couple of hours during the 30 days before the survey) among U.S. high school students, and on the prevalence of binge drinking among high school students who reported current alcohol use.

Results: Among U.S. adults, the prevalence of reported binge drinking was 15.2% among landline respondents. Binge drinking was more common among men (20.7%), persons aged 18–24 years (25.6%) and 25–34 years (22.5%), whites (16.0%), and persons with annual household incomes of $75,000 or more (19.3%). Among cellular telephone respondents, the overall prevalence of binge drinking (20.6%) was higher than among landline respondents, although the demographic patterns of binge drinking were similar. Prevalence among high school students was 41.8% for current alcohol use, 24.2% for binge drinking, and 60.9% for binge drinking among students who reported current alcohol use.

Conclusions: Binge drinking is common among U.S. adults, particularly those with higher household incomes, and among high school students. Binge drinking estimates for adults were higher in the cellular telephone sample than in the landline sample. Most youths who reported current alcohol use also reported binge drinking.

Implications for Public Health Practice: Binge drinking is a serious problem among adults and youths that can be reduced by implementation of evidence-based interventions.

Excessive alcohol use was the third leading preventable cause of death in the United States (*1*), and it annually accounted for, on average, approximately 79,000 deaths* per year and 2.3 million years of potential life lost (YPLL) during 2001–2005.† Binge drinking was responsible for more than half of those deaths and two thirds of the YPLL (*2*). *Healthy People 2010* called for reducing the overall prevalence of binge drinking among adults and youths.§ For this report, data from landline and cellular telephone respondents to the 2009 Behavioral Risk Factor Surveillance System (BRFSS) were used to estimate the prevalence of binge drinking among adults in the United States, and data from the 2009 National Youth Risk Behavior

* An estimated 4,675 deaths or 6% of all alcohol-attributable deaths involved persons aged <21 years.

† YPLL for 2001–2005 were estimated using the Alcohol-Related Disease Impact (ARDI) application using death and life expectancy data from the National Vital Statistics System. Additional information is available at https://apps.nccd.cdc.gov/ardi/homepage.aspx.

§ Objectives 26-11c and 26-11d. Available at http://www.healthypeople.gov/data/midcourse/html/focusareas/fa26objectives.htm.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
www.cdc.gov/mmwr

Survey (YRBS) were used to estimate the prevalence of current alcohol use and binge drinking among high school students in the United States.

Methods

BRFSS is a state-based telephone survey of civilian, noninstitutionalized U.S. adults that collects information on many leading health conditions and health risk behaviors, including binge drinking. BRFSS surveys are administered to households with landlines in all states and the District of Columbia (DC). In 2009, all 50 states (except South Dakota and Tennessee) and DC began administering up to 10% of their total state completed surveys to cellular telephone users. Annually, respondents who report consuming any alcoholic beverages are asked how many times they engaged in binge drinking, defined as consuming four or more alcoholic drinks per occasion for women and five or more drinks per occasion for men during the preceding 30 days. The prevalence of binge drinking was calculated by dividing the total number of respondents who reported at least one binge drinking episode during the preceding 30 days by the total number of BRFSS respondents. Respondents who refused to answer, had a missing answer, or who answered "don't know/not sure" were excluded from the analysis.

In 2009, the median Council of American Survey and Research Organizations (CASRO) response rate for the landline BRFSS was 52.9% (range among states: 37.9%–66.9%), and the median CASRO cooperation rate was 75.0% (range: 55.5%–88.0%). The preliminary median CASRO response rate for the cellular telephone BRFSS was 37.6% (range among states: 20.5%–60.3%), and the preliminary median CASRO cooperation rate was 76.0% (range: 47.7%–90.9%). A total of 412,005 landline respondents and 15,578 cellular telephone respondents were included in the analysis. Data collected by landline were weighted to the age, sex, and racial/ethnic distribution of each state's adult population and to the respondent's probability of selection. Cellular telephone data were unweighted, but were age-adjusted to the 2000 U.S. Census standard population.

The biennial national YRBS, a component of CDC's Youth Risk Behavior Surveillance System, estimates the prevalence of health risk behaviors among U.S. high school students. The 2009 national survey obtained cross-sectional data representative of public- and private-school students in grades 9–12 in the 50 states and DC (*3*). Students completed an anonymous, self-administered questionnaire that included questions about alcohol use. Students from 158 schools completed 16,460 questionnaires. The school response rate was 81%, the student response rate was 88%, and the overall response rate was 71%. After quality control measures were applied, data from 16,410 students were available for analysis.

Current alcohol use is defined in YRBS as having had at least one drink of alcohol on at least 1 day during the 30 days before the survey, and binge drinking is defined as having had five or more drinks of alcohol within a couple of hours on at least 1 day during the 30 days before the survey. The prevalence of current alcohol use was calculated by dividing the total number of respondents who reported current alcohol use by the total number of respondents, and the prevalence of binge drinking was calculated by dividing the total number of respondents who reported binge drinking by the total number of respondents. The prevalence of binge drinking among current drinkers was calculated by dividing the total number of binge drinkers by the total number of current drinkers. Respondents who had missing information were excluded from the analysis. YRBS data were weighted to adjust for school and student nonresponse and oversampling of black and Hispanic students.

BRFSS Results

Landline telephone respondents. The overall prevalence of binge drinking among adult BRFSS landline respondents was 15.2% (Table 1). Binge drinking prevalence among men (20.7%) was twice that for women (10.0%). Binge drinking also was most common among persons aged 18–24 years (25.6%) and 25–34 years (22.5%), and then gradually declined with increasing age. The prevalence of binge drinking among landline respondents who were non-Hispanic whites (16.0%) and Hispanics (16.3%) was significantly higher than the prevalence for non-Hispanic blacks (10.3%). Landline respondents with some college education (16.4%) and college graduates (15.3%) were most likely to report binge drinking, whereas those who did not graduate from high school were the least likely to report binge drinking (12.1%). Binge drinking prevalence also increased with household income and was most commonly reported by respondents with annual household incomes of $75,000 or more (19.3%).

By state, the prevalence of binge drinking ranged from 6.8% (Tennessee) to 23.9% (Wisconsin) (Figure 1).

States with the highest prevalence of adult binge drinking were located in the Midwest, North Central Plains, and lower New England. Additional high-prevalence states included Alaska, Delaware, DC, and Nevada.

Cellular telephone respondents. In 2009, the overall, age-adjusted prevalence of binge drinking among adult BRFSS cellular telephone respondents was 20.6% (Table 2). Binge drinking prevalence among men (26.5%) was almost twice that for women (14.5%). Binge drinking also was most common among persons aged 18–24 years (35.4%) and 25–34 years (30.8%), and then gradually declined with increasing age. The prevalence of binge drinking among cellular telephone respondents who were non-Hispanic whites (22.3%), other non-Hispanics (including American Indians/Alaska Natives and Asians/Native Hawaiians or other Pacific Islanders) (19.9%), and Hispanics (17.5%) was significantly higher than the prevalence for non-Hispanic blacks (13.9%). Binge drinking prevalence increased with household income and was reported most commonly by respondents with annual household incomes of $75,000 or more (25.4%).

YRBS Results

In 2009, the prevalence of current alcohol use and of binge drinking among high school students was 41.8% and 24.2%, respectively (Table 3). The prevalence of binge drinking was similar among boys (25.0%) and girls (23.4%). Non-Hispanic white (27.8%) and Hispanic (24.1%) students had a higher prevalence of reported binge drinking than non-Hispanic black students (13.7%). Binge drinking prevalence increased with grade level; prevalence among 12th grade students (33.5%) was more than twice that among 9th grade students (15.3%).

The prevalence of binge drinking among high school students who reported current alcohol use was 60.9% (64.1% among boys and 57.5% among girls) (Table 3). Non-Hispanic white (64.8%) and Hispanic (59.3%) students who reported current alcohol use had a higher prevalence of binge drinking than non-Hispanic black (43.5%) students who reported current alcohol use. The prevalence of binge drinking among students who reported current alcohol use increased with grade level, from 51.1% in 9th grade students to 67.4% in 12th grade students.

From 1993 to 2009, the prevalence of binge drinking among adults did not decrease among men or women. Among high school students, the prevalence of binge drinking decreased among boys, but has remained about the same among girls (Figure 2).

TABLE 1. Binge-drinking prevalence, by sociodemographic characteristics, among adults surveyed by landline telephone (N = 412,005) — Behavioral Risk Factor Surveillance System (BRFSS), United States, 2009*

Characteristic	Weighted† survey population (%)	Weighted binge-drinking prevalence (%)	(95% CI§)
Total	100.0	15.2	(14.9–15.4)
Sex			
Male	48.5	20.7	(20.2–21.2)
Female	51.5	10.0	(9.7–10.3)
Age group (yrs)			
18–24	11.6	25.6	(24.2–26.9)
25–34	18.5	22.5	(21.7–23.3)
35–44	19.0	17.8	(17.2–18.4)
45–64	33.7	12.1	(11.8–12.4)
≥65	17.2	3.8	(3.6–4.0)
Race/Ethnicity			
White, non-Hispanic white	69.9	16.0	(15.7–16.3)
Black, non-Hispanic black	10.0	10.3	(9.5–11.2)
Hispanic	13.4	16.3	(15.2–17.3)
Other, non-Hispanic	6.7	12.1	(10.9–13.2)
Education level			
Less than high school diploma	10.5	12.2	(11.3–13.2)
High school diploma	28.2	15.0	(14.5–15.5)
Some college	26.6	16.4	(15.8–16.9)
College graduate	34.7	15.3	(14.9–15.8)
Annual household Income			
<$25,000	25.9	12.1	(11.5–12.7)
$25,000 to <$50,000	25.0	14.6	(14.0–15.2)
$50,000 to <$75,000	16.3	16.8	(16.2–17.5)
≥$75,000	32.8	19.3	(18.8–19.9)

* 2009 BRFSS landline respondents were from all 50 states and the District of Columbia.
† Weighted percentage reflects the distribution of the U.S. adult population.
§ Confidence interval.

Conclusions and Comment

The results in this report indicate that binge drinking is common among U.S. adults and high school students. Binge drinking among adults was slightly higher in 2009 (15.2%) than in 1993 (14.2%).[¶] Although binge drinking continued to be common among all population groups, it was most common among males, persons aged 18–34 years, and those with annual household incomes of $75,000 or more. Estimates of binge drinking were higher for the cellular telephone sample (20.6% overall) than the landline sample (15.2% overall), particularly among younger adults. By state, compared to 1993, the prevalence of binge drinking among adults in 2009 was significantly greater in 20 states, was significantly less in two states, and stayed about the same in 29 states (CDC,

[¶] Information available at http://www.cdc.gov/alcohol/index.htm.

FIGURE 1. Prevalence of binge drinking among adults surveyed by landline telephone, by state — Behavioral Risk Factor Surveillance System, United States, 2009

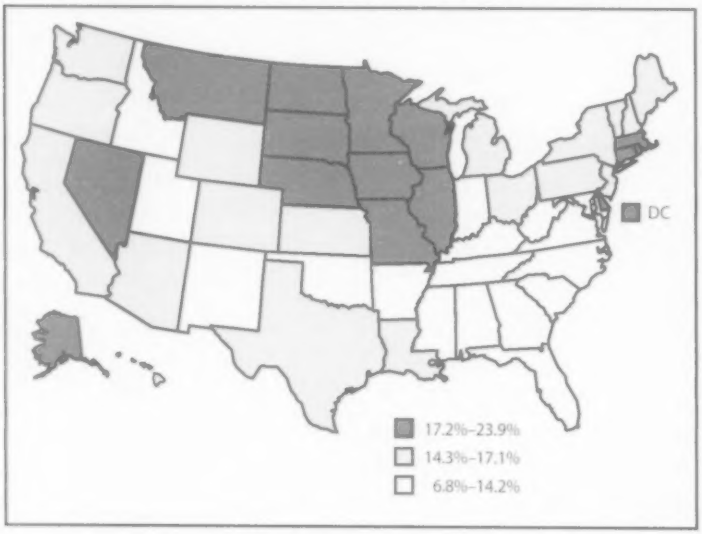


TABLE 2. Binge-drinking prevalence, by sociodemographic characteristics, among adults surveyed by cellular telephone (N = 15,578) — Behavioral Risk Factor Surveillance System (BRFSS), United States, 2009*

Characteristic	Unweighted survey population %	Unweighted age-adjusted† binge-drinking prevalence %	(95% CI§)
Total	100.0	20.6	(19.9–21.3)
Sex			
Male	51.5	26.5	(25.5–27.4)
Female	48.5	14.5	(13.7–15.3)
Age group (yrs)			
18–24	20.3	35.4	(33.8–37.1)
25–34	30.3	30.8	(29.4–32.1)
35–44	17.3	23.0	(21.4–24.6)
45–64	26.7	15.9	(14.8–17.0)
≥65	5.4	4.2	(2.8–5.6)
Race/Ethnicity			
White, non-Hispanic	71.9	22.3	(21.4–23.2)
Black, non-Hispanic	8.7	13.9	(11.9–15.9)
Hispanic	10.5	17.5	(15.5–19.6)
Other, non-Hispanic	8.9	19.9	(17.7–22.0)
Education level			
Less than high school diploma	9.7	19.2	(17.1–21.4)
High school diploma	28.5	19.8	(18.6–21.0)
Some college	30.4	19.9	(18.7–21.1)
College graduate	31.4	22.6	(21.3–23.9)
Annual household income			
<$25,000	35.8	18.9	(17.8–20.1)
$25,000 to <$50,000	30.7	21.8	(20.5–23.2)
$50,000 to <$75,000	15.5	21.6	(19.8–23.5)
≥$75,000	18.0	25.4	(23.4–27.3)

* 2009 BRFSS cellular telephone respondents were from 48 states (excluding South Dakota and Tennessee) and the District of Columbia.
† Age-adjusted to the 2000 U.S. Census standard population.
§ Confidence interval.

unpublished data, 2010). The prevalence of current alcohol use and binge drinking among high school students was lower in 2009 (41.8% and 24.2%) than in 1993 (48.0% and 30.0%); however, the differences in these measures were significant among boys, but not girls.** Current alcohol use and binge drinking increased with grade. The majority of high school students who report current alcohol use also report binge drinking across all demographic groups, except black students. Among adults, 29% of those who report current drinking also report binge drinking (*4*).

The higher prevalence of binge drinking among adult males, whites, young adults, and persons with higher household incomes has been reported before (*5*). The high prevalence partly could reflect that binge drinking, unlike other leading health risks (e.g., smoking and obesity), has not been widely recognized as a health risk or subjected to intense prevention efforts (*4*). The differences in binge drinking among population groups might reflect differences in state and local laws that affect the price, availability, and marketing of alcoholic beverages (*6*). Estimates of binge drinking from the cellular telephone sample were higher than from the landline sample, although the demographic patterns of binge drinking were similar. Higher estimates of binge drinking have been reported previously among cellular telephone respondents relative to landline respondents in a small number of states (CDC, unpublished data, 2010), but have not been reported nationally. During the last half of 2009, an estimated 24.5% of U.S. households had only cellular telephones.†† As the U.S. population increasingly adopts cellular telephones in place of landlines, the BRFSS survey will need to incorporate cellular telephone respondents to help assure representativeness, particularly when measuring behaviors that are common among younger adults.

The high prevalence of binge drinking among high school students also is consistent with previous reports (*7*), and affirms that most youths who drink alcohol do so to the point of intoxication. The similarities in the distribution of binge drinking among youths and adults by various demographic characteristics (e.g., race and ethnicity) also are consistent with the strong relationship between youth and adult drinking

** Information available at http://apps.nccd.cdc.gov/youthonline/app/default.aspx.
†† Information available at http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201005.htm.

in states (*8*), which is influenced strongly by state alcohol control policies (*6*).

The findings in this report are subject to at least six limitations. First, BRFSS and YRBS data are self-reported. Among adults, alcohol consumption generally, and excessive drinking in particular, are underreported in surveys because of recall, social desirability, and nonresponse bias (*9*). A recent study found that BRFSS identifies only 22% to 32% of presumed alcohol consumption in states based on alcohol sales (*10*). Second, an increasing proportion of youths and young adults aged 18–34 years use cellular telephones exclusively (*11*); therefore, landline surveys of persons in this age group might not be representative of this population. Third, the results of the cellular telephone survey were unweighted, but results of the landline survey were weighted to represent the U.S. adult population. However, the distribution of cellular telephone respondents by various demographic characteristics (e.g., sex and race/ethnicity) was quite similar to the composition of the general population, and the cellular telephone data were age-adjusted to the 2000 U.S. Census standard population. Fourth, response rates for both the landline and cellular telephone BRFSS were low, which increases the risk for response bias. Fifth, YRBS defines binge drinking for boys and girls as five or more drinks within a couple of hours, and the prevalence of binge drinking among girls would likely have been higher if it were defined using a four-drink threshold, consistent with national recommendations. Finally, YRBS data apply only to youths who attend school, and therefore are not representative of all persons in this age group. Nationwide, in 2007, of persons aged 16–17 years, approximately 4% were not enrolled in a high school program and had not completed high school.[§§]

To reduce the adverse impact of binge drinking on individuals and communities, health professionals and community leaders should consider implementing

Key Points

- Binge drinking causes more than half of the 79,000 deaths caused by excessive drinking.
- Excessive alcohol use, including binge drinking, is the third leading preventable cause of death in the United States.
- Among U.S. adults, 15% (33 million men and women) and one in four high school students reported binge drinking.
- The prevalence of adult binge drinking has not declined for more than 15 years. Implementation of evidence-based interventions can reduce binge drinking in adults and youths.
- Additional information is available at http://www.cdc.gov/vitalsigns.

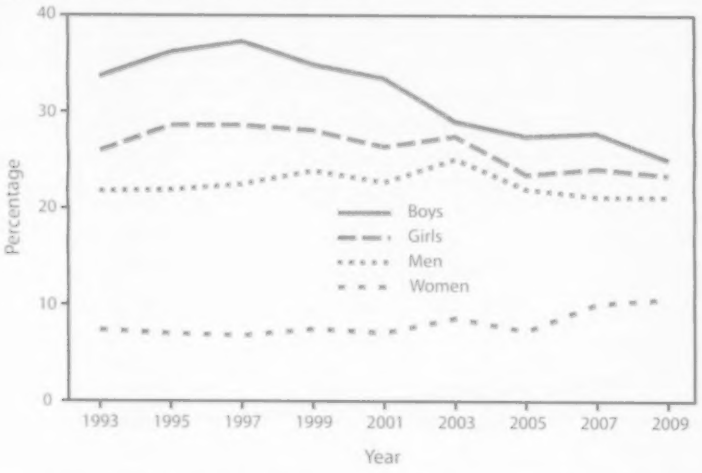
[§§] Information available at http://nces.ed.gov/pubs2009/2009064.pdf.

TABLE 3. Prevalence of current alcohol use and binge drinking, by sociodemographic characteristics among 9th–12th grade students — Youth Risk Behavior Survey, United States, 2009

	Current alcohol use (n = 14,864*)		Binge drinking (n = 16,009*)		Binge drinking among students reporting current alcohol use (n = 6,231*)	
Characteristic	Weighted %	(95% CI†)	Weighted %	(95% CI)	Weighted %	(95% CI)
Total	**41.8**	**(40.2–43.4)**	**24.2**	**(22.7–25.8)**	**60.9**	**(58.4–63.5)**
Sex						
Male	40.8	(38.6–43.0)	25.0	(22.9–27.0)	64.1	(61.0–67.2)
Female	42.9	(41.2–44.6)	23.4	(21.9–25.0)	57.5	(54.6–60.4)
Race/Ethnicity						
White, non-Hispanic	44.7	(42.5–47.0)	27.8	(25.7–29.8)	64.8	(61.9–67.8)
Black, non-Hispanic	33.4	(30.5–36.2)	13.7	(11.7–15.8)	43.5	(39.2–47.9)
Hispanic	42.9	(40.1–45.7)	24.1	(21.7–26.6)	59.3	(55.4–63.2)
Other, non-Hispanic	32.6	(28.2–37.1)	17.6	(14.2–21.0)	56.5	(50.8–62.1)
Grade						
9	31.5	(29.0–34.0)	15.3	(13.8–16.8)	51.1	(47.4–54.8)
10	40.6	(37.8–43.4)	22.3	(19.6–24.9)	58.2	(53.6–62.7)
11	45.7	(41.7–49.7)	28.3	(25.3–31.3)	64.6	(61.7–67.6)
12	51.7	(49.0–54.4)	33.5	(31.1–36.0)	67.4	(64.3–70.4)

* Reflects usable responses to this question.
† Confidence interval.

FIGURE 2. Prevalence of binge drinking among high school students and adults, by sex — Youth Risk Behavior Survey (YRBS)* and Behavioral Risk Factor Surveillance System (BRFSS),† United States, 1993–2009



* YRBS binge drinking definition: 1993–2009 having ≥5 alcoholic drinks within a couple of hours during the preceding 30 days.

† BRFSS binge drinking definitions: 1993–2005 having ≥5 alcoholic drinks on one occasion; 2006–2009 males having ≥5 drinks on one occasion, females having ≥4 drinks on one occasion during the preceding 30 days.

interventions that have been proven in scientific studies to reduce binge drinking among adults and youths. Evidence-based interventions for individuals include those recommended by the U.S. Preventive Services Task Force[¶¶] and evidence-based interventions for communities include those recommended in the Guide to Community Preventive Services.[***] Local leaders need to carefully consider which of these interventions would be most acceptable, feasible, and effective in their communities; other innovative solutions also might be found for tackling this problem and further research is encouraged to find such solutions. The findings in this report also support the need to improve public health surveillance for binge drinking among adults by increasing the number of cellular telephone respondents to the BRFSS.

[¶¶] Information available at http://www.uspreventiveservicestaskforce.org/uspstf/uspsdrin.htm.

[***] Information available at http://www.thecommunityguide.org/alcohol/index.html.

Reported by

D Kanny, PhD, Y Liu, MS, MPH, RD Brewer, MD, Div of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion; W Garvin, L Balluz, ScD, Div of Behavioral Surveillance, Office of Surveillance, Epidemiology, and Laboratory Svcs, CDC.

References

1. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of deaths in the United States, 2000. JAMA 2004;291:1238–45.
2. CDC. Alcohol attributable deaths and years of potential life lost, United States, 2001. MMWR 2004;53:866–70.
3. CDC. Youth risk behavior surveillance—United States, 2009. MMWR 2010;59(No. SS-5).
4. Brewer RD, Swan MH. Binge drinking and violence. JAMA 2005;294:616–8.
5. CDC. Sociodemographic differences in binge drinking among adults—14 states, 2004. MMWR 2009;58:301–4.
6. Nelson TF, Naimi TS, Brewer RD, Weschler H. The state sets the rate: the relationship among state-specific college binge drinking, state binge drinking rates, and selected state alcohol control policies. Am J Public Health 2005;95:441–6.
7. Miller J, Naimi T, Brewer R, Everett Jones S. Binge drinking and associated health risk behaviors among high school students. Pediatrics 2007;119:76–84.
8. Nelson DE, Naimi TS, Brewer RD, Nelson HA. State alcohol-use estimates among youth and adults, 1993–2005. Am J Prev Med 2009;36:218–24.
9. Stockwell T, Donath S, Cooper-Stanbury M, Chikritzhs T, Catalano P, Mateo C. Under-reporting of alcohol consumption in household surveys: a comparison of quantity-frequency, graduated-frequency and recent recall. Addiction 2004;99:1024–33.
10. Nelson DE, Naimi TS, Brewer RD, Roeber J. US state alcohol sales compared to survey data, 1993–2006. Addiction 2010;105:1589–96.
11. Delnevo CD, Gundersen DA, Hagman BT. Declining estimated prevalence of alcohol drinking and smoking among young adults nationally: artifacts of sample undercoverage? Am J Epidemiol 2008;167:15–9.